

Noise Measurement and Computation

WAC 296-817-300

Summary

YOUR RESPONSIBILITY:

Conduct noise monitoring or measurement to evaluate employee exposures in your workplace

You must

Make sure that noise-measuring equipment meets recognized standards
WAC 296-817-30005 300-2

Measure employee noise exposure
WAC 296-817-30010 300-3

Use these equations when estimating full-day noise exposure from sound level measurements
WAC 296-817-30015 300-5



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Rule

WAC 296-817-30005

Make sure that noise-measuring equipment meets recognized standards

You must

- Make sure that noise dosimetry equipment meets these specifications:
 - Dosimeters must be equipment class 2AS-90/80-5 of the American National Rule Specification for Personal Noise Dosimeters, ANSI S1.25-1991, such dosimeters are normally marked "Type 2."



Note:

Make sure any dosimeter you use is Type 2 equipment that:

- Uses slow integration and A-weighting of sound levels.
- Has the **criterion level** set to 90 dB, so the dosimeter will report a constant 8-hour exposure at 90 dBA as a 100% dose.
- Has the **threshold level** set at 80 dB, so the dosimeter will register all noise above 80 dB.
- Uses a 5 dB **exchange rate** for averaging of noise levels over the sample period.

You must

- Make sure that sound level meters meet these specifications:
 - American National Standard Specification for Sound Level Meters, S1.4-1984, Type 2 requirements for sound level meters, such sound level meters are normally marked "Type 2."
 - For continuous noise measurements, the meter must be capable of measuring A-weighted sound levels with slow response
 - For impulse or impact noise measurements, the meter must be capable of indicating maximum C-weighted sound level measurements with fast response.

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Rule

WAC 296-817-30005 (Continued)

You must

- Calibrate dosimeters and sound level meters used to monitor employee noise exposure:
 - Before and after each day's use
- AND**
- Following the instrument manufacturer's calibration instructions.



Note:

- You may conduct dosimetry using an exchange rate less than 5 dB and compare the results directly to the noise evaluation criteria in Table 1.
- For measuring impulse and impact noise you may also use a sound level meter set to measure maximum impulse C-weighted sound levels or peak C-weighted sound levels.

WAC 296-817-30010

Measure employee noise exposure

Important:

A noise dosimeter is the basis for determining total daily noise exposure for employees. However, where you have constant noise levels, you may estimate employee noise exposure using measurements from a sound level meter. Calculation of the employee noise exposure must be consistent with WAC 296-817-30015.

You must

- Include all:
 - Workplace noise from equipment and machinery in use
 - Other noise from sources necessary to perform the work
 - Noise outside the control of the exposed employees.

-Continued-

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Rule

WAC 296-817-30010 (Continued)

You must

- Use a noise dosimeter when necessary to measure employee noise dose
- Use a sound level meter to evaluate continuous and impulse noise levels
- Identify all employees whose exposures equal or exceed the Noise Evaluation Criteria as follows:

Noise Evaluation Criteria

<i>Criteria</i>	<i>Description</i>	<i>Requirements</i>
85 dBA TWA ₈	Full-day employee noise exposure dose. If you have one or more employees whose exposure equals or exceeds this level, you must have a hearing loss prevention program	<ul style="list-style-type: none">– Hearing protection– Training– Audiometric testing
90 dBA TWA ₈	Full-day employee noise exposure dose. If you have one or more employees whose exposure equals or exceeds this level, you must reduce employee noise exposures in the workplace	Noise controls (in addition to the requirements for 85 dBA TWA ₈)
115 dBA measured using slow response	Extreme noise level (greater than one second in duration)	<ul style="list-style-type: none">– Hearing protection– Signs posted in work areas warning of exposure
140 dBC measured using fast response	Extreme impulse or impact noise (less than one second in duration)	Hearing protection

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Rule

WAC 296-817-30015

Use these equations when estimating full-day noise exposure from sound level measurements

You must

- Compute employee's full-day noise exposure by using the appropriate equations from Table 3 "Noise Dose Computation" **when** using a sound level meter to estimate noise dose.

Table 3
Noise Dose Computation

<i>Description</i>	<i>Equation</i>
Compute the noise dose based on several time periods of constant noise during the shift	<p>The total noise dose over the work day, as a percentage, is given by the following equation where C_n indicates the total time of exposure at a specific noise level, and T_n indicates the reference duration for that level.</p> $D = 100 \times \left(\frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_3}{T_3} + \dots + \frac{C_n}{T_n} \right)$
The reference duration is equal to the time of exposure to continuous noise at a specific sound level that will result in a one hundred percent dose	<p>The reference duration, T, for sound level, L, is given in hours by the equation:</p> $T = \frac{8}{2^{\left(\frac{L-90}{5}\right)}}$
Given a noise dose as a percentage, compute the equivalent 8-hour time weighted average noise level	<p>The equivalent eight-hour time weighted average, TWA_8, is computed from the dose, D, by the equation:</p> $TWA_8 = 16.61 \times \log_{10} \left(\frac{D}{100} \right) + 90$



Helpful Tool:

Noise Computation Examples

You can find noise computation examples in the Resources section of this chapter.



Notes
